

# **JCE: Java Collaborative Environment**

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# Scope

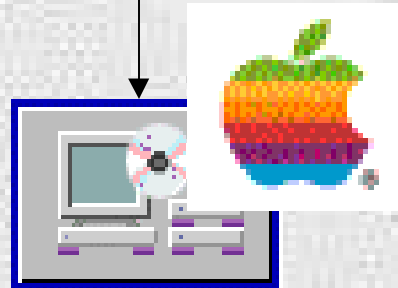
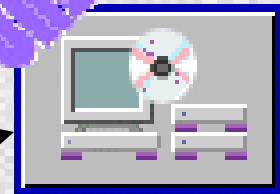
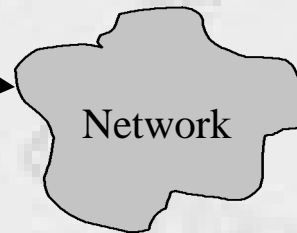
- Background
- Goals
- JCE Features
- Important Issues/Problems
- Conclusions and current Project

# **Background**

- Most existing conferencing systems require:
  - the same windowing system
  - the same operating systems
  - the same hardware platform
- Examples:
  - Netmeeting
  - XTV
  - CuSeeme

# Goals

**Windows 95/NT**



## Goals

- Overcoming platform-dependency problems
- Developing state-of-the-art multi-platform multimedia conferencing tool
- Providing seamless communications among participants on heterogeneous systems

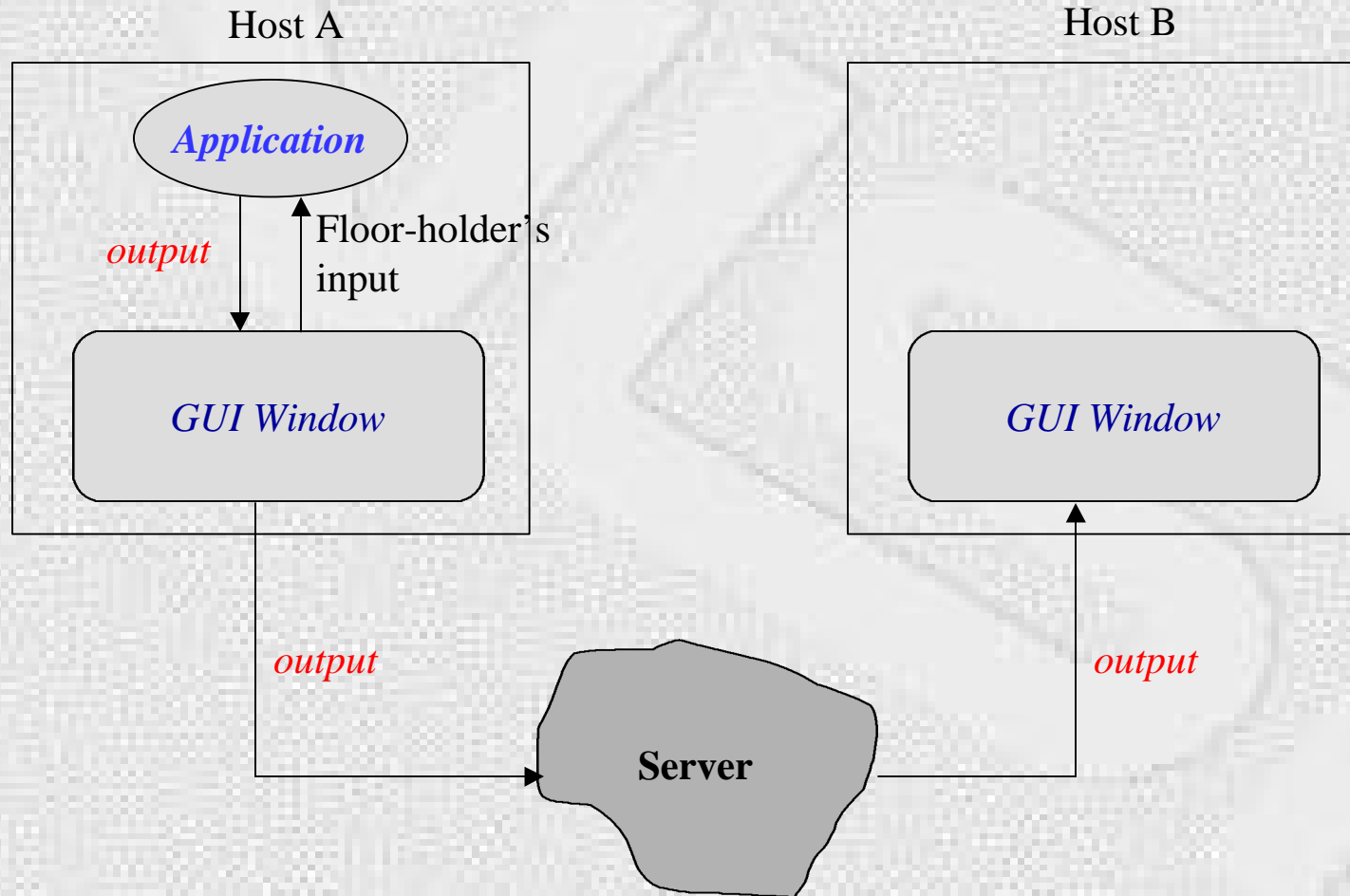
## **JCE Features**

- Collaborative AWT (Abstract Windowing Toolkit)
- Network communication services
- Conference management
- Floor control management
- Replication object management
- Audio system

## **Sharing Application Architectures**

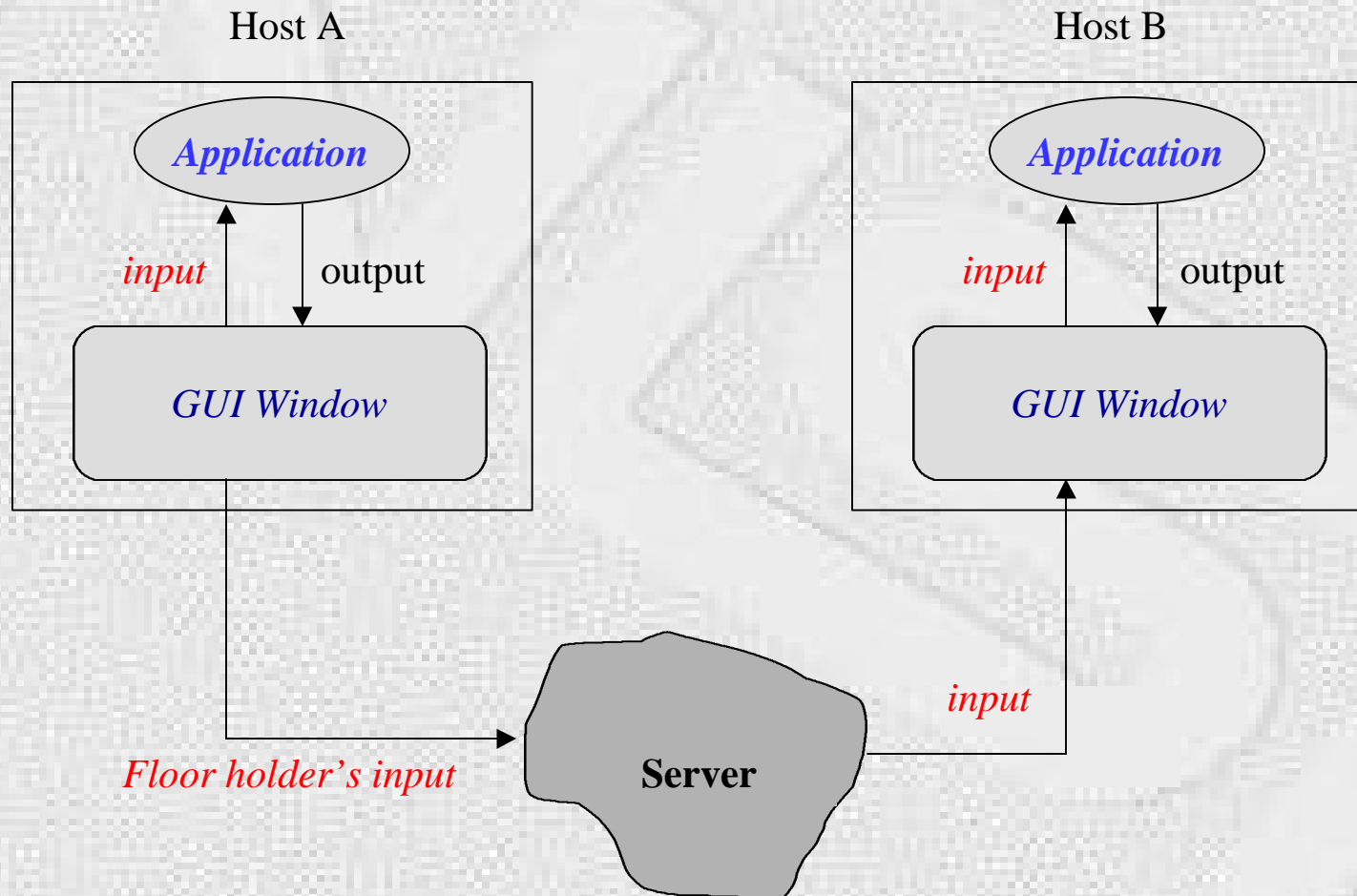
- Centralized architecture
- Replicated architecture

# Centralized Architecture

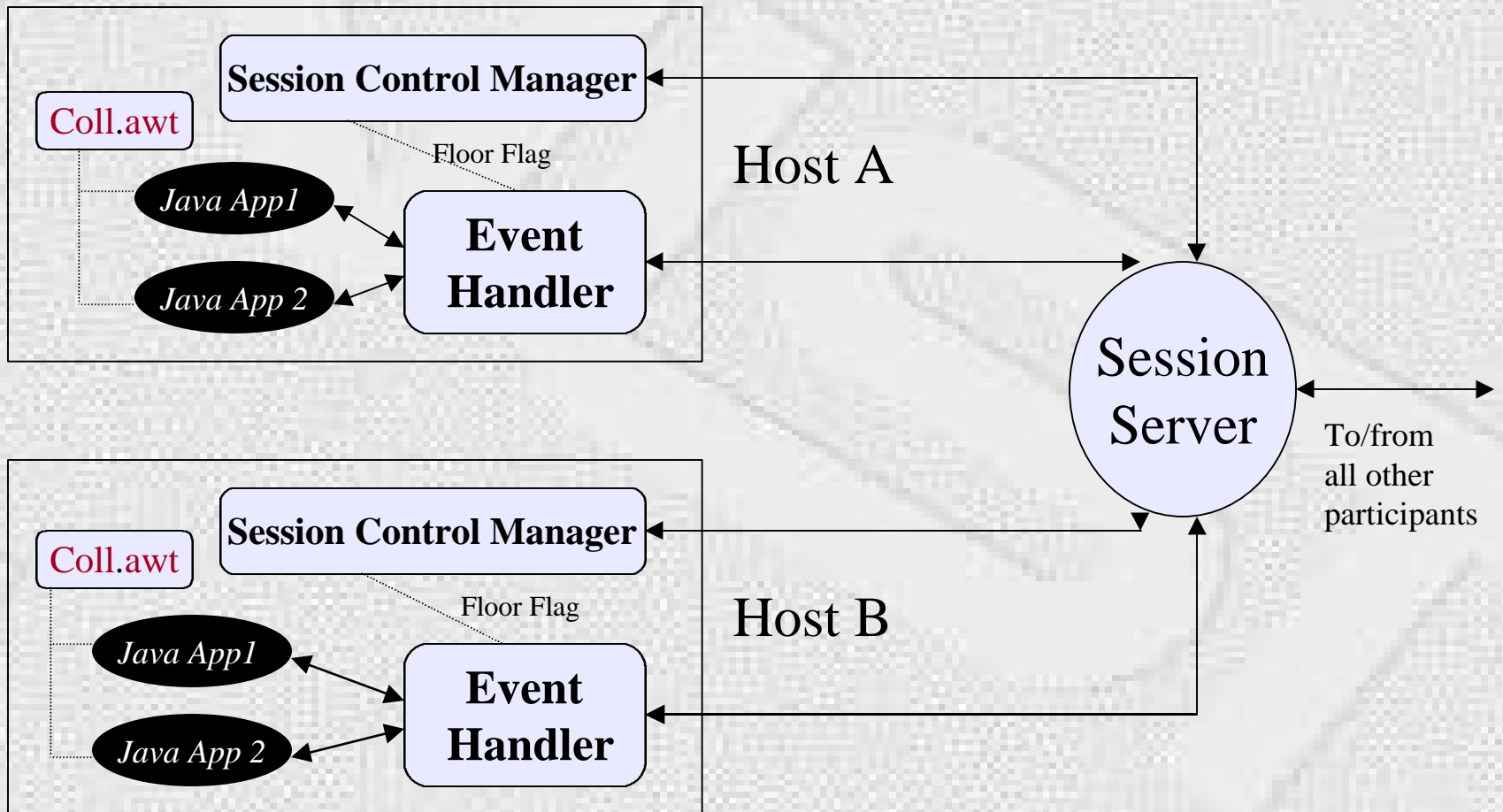




# Replicated Architecture



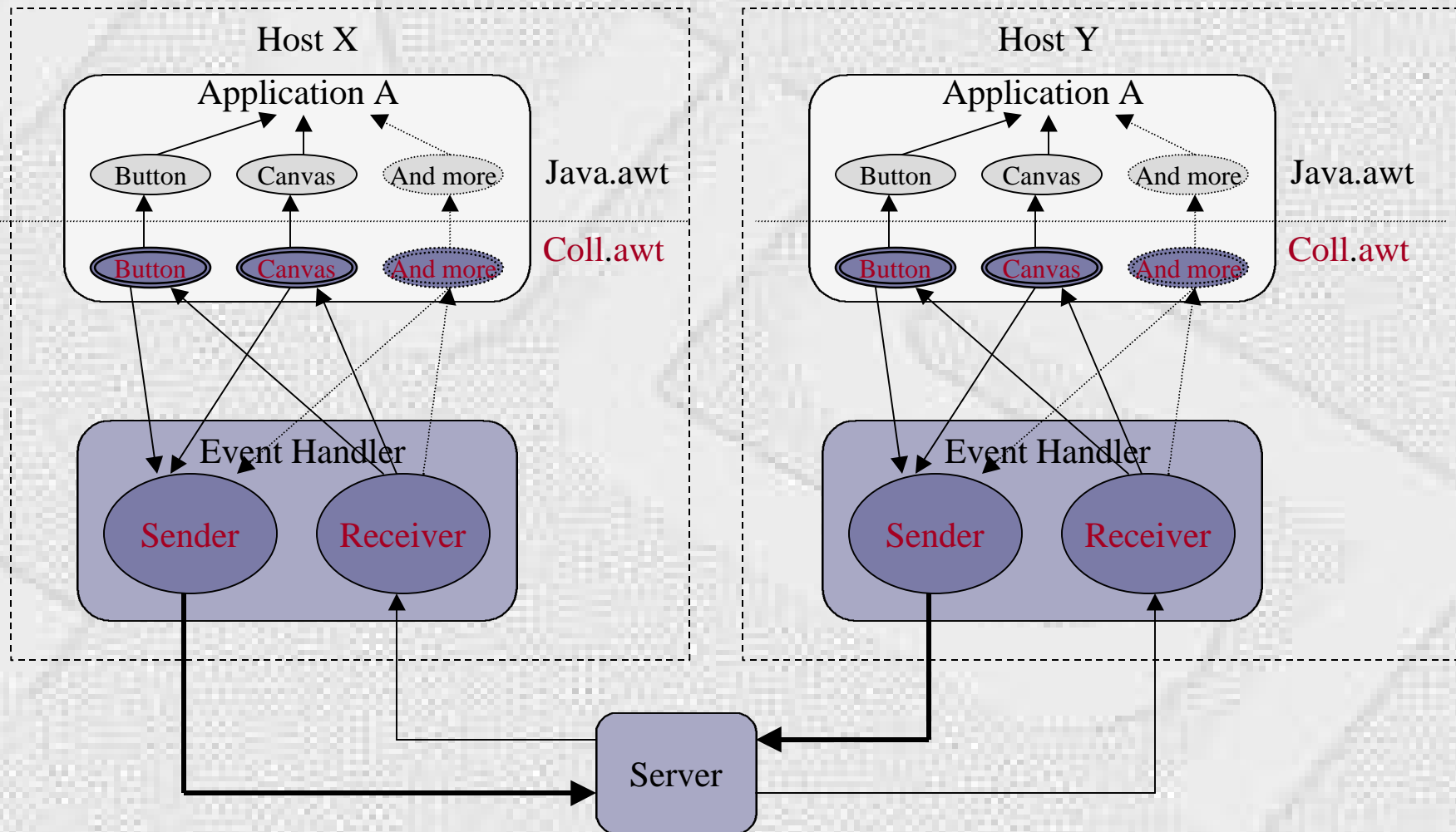
# System Architecture



# Collaborative AWT and Event Handler

- Extended java.awt package -> **coll.awt**
- Collaboration mechanisms
  - to intercept, distribute and recreate the user events transparently
- Event Handler
  - sends/receives user events
  - locates a target component of the application
  - recreates/dispatches events

## Collaborative AWT and Event Handler (cont'd)



# Conference Management

- Session control manager:
  - Session graphical user interface
  - To call, join and leave a session
  - To request and release a floor
- Session Server:
  - Distribution of all the messages
  - Group management for a given session
  - Server floor management
  - Event logging for later-comers

## Network Communications Services

- Socket-based JCE
- RMI-based JCE

# **Floor Control Management**

- Floor Policies:
  - Request-and-Get policy
  - Request-and-Wait policy
  - No-Floor policy

# Audio System

- Full-duplex audio
  - Sun Solaris
  - Windows 95/NT



# **Replication Management**

- The consistency of shared objects
- The same execution environment
- The correct operations of the application
- What to replicate
  - application code
  - initial objects (e.g., bit maps, images, input files, etc.)
  - environment variables

## **Replication Management (cont'd)**

- What to do with the replicated objects
  - Stay where they are (default); or
  - remove at the end of a session
- How to replicate (replication scheme)
  - Use an application profile
  - Profile editor

# Replication Management (cont'd)

- RFM Server
  - is run where objects to be replicated is located
- RFM Client
  - parses a profile
  - replicates all the objects for the application

## Issues/Problems

- These are important in supporting desktop conferencing:
  - Replication Management
  - Audio and Video
  - Late-comer
  - Scalability through the use of reliable multicasting
  - Distributed management of multimedia conference resources
  - Conference information service

## **Issues/Problems (cont'd)**

- Recording and replaying
- Inter-stream adaptation
- Monitoring and recovery

## Current Project

- Developing a multi-platform video tool
  - Using:
    - Java Media Framework (JMF)
    - developing own native methods
  - Can be integrated in any conferencing tools
  - Video resource management
    - Audio-operated video
  - Inter-stream synchronization

## **Conclusions**

- Collaboration mechanisms
- Conferencing interface
- Network communication services
- Conference management
- Floor management
- Replication management
- Audio system